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Perceived proximity and trust network on creative performance in virtual collaboration environment

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Abstract

Because of intense competition, organizations are devoting more effort to improving employees' creative performance. Using virtual teams of employees who collaborate and communicate through information and communication technologies, it is possible to creatively solve organizational problems through a flexible use of scattered knowledge resources in organizations. The purpose of this study was to investigate the effects of two kinds of trust networks (i.e., cognitive-based and affective-based trust networks) on employee creative performance during virtual collaboration. In addition, the author examined the impact of perceived proximity (i.e., a cognitive and affective sense of relational closeness) on the relationship between the trust networks and creative performance. This study provides academic and practical implications for establishing competitive strategies and utilizing virtual teams.

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Keywords: virtual team; social network analysis; trust; proximity; creativity

1. Introduction

With the advent of information technology, virtual collaborations became ubiquitous and unavoidable for organizations and are now regarded as a crucial way of gaining competitive advantage in rapidly changing environments. Competitive pressures require firms to both explore new knowledge and exploit knowledge that they already have [1, 2] to enhance organizational creativity. To fully achieve potential creativity using organizational resources at both the individual and organizational levels, many practitioners and researchers have focused on the potential of information and communication technologies (ICT) to cope with space and time constraints that limit face-to-face meetings [3, 4].

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Here, virtual teams (VTs) refers to work groups whose members are geographically dispersed and work remotely [5, 6], communicating exclusively through an internet-based information technology platform for virtual collaboration. VTs have become common units in business organizations and have received considerable attention from social and organizational psychologists [7]. Studies have reported that VTs may increase productivity [8, 9] and have attempted to investigate factors affecting VT performance. In virtual collaboration environments, team members are geographically dispersed, usually lack a shared social context and a shared history, and interact through solely through ICT [10]. Therefore, fostering good teamwork, reducing uncertainty, and building successful relationships are particularly essential for successful collaboration in VTs. According to past studies, trust is traditionally regarded as an important factor for developing relationships and ensuring the effectiveness of group work [11, 12]. In addition, researchers have generally agreed that it is critical for geographically distributed teams to effectively communicate and interact with colleagues via electronic media because of the lack of traditional social control [13] and face-to-face interactions [14].

Past studies demonstrate that proximity has a positive association with communication and interactions among individuals [15–17]. For instance, Hoegl and Proserpio [15] suggested that team members' proximity is significantly associated with teamwork quality. Proximity refers to "the physical distance between people measured in units such as inches, meters, or miles" [18, p. 76] and conventional wisdom is that people feel closest to others who are in close physical proximity to them [18, 19]. Although proximity is an essential factor for team performance, team members tend to feel distant during virtual collaboration because they are geographically dispersed. However, recent research explained the paradoxical phenomenon, in which someone feels close to geographically distant team members, by proposing a model of perceived proximity [19] and emphasized psychological or perceived proximity as an important factor for VTs' performance [20–22].

Building trust and managing perceived proximity in VTs is particularly critical because team members interact in dispersed and computer-mediated communication environment where they have limited face-to-face contact and lack initial information for the other members of the team. Considering the impact of such interaction is essential as well as taking into account creativity as a social process resulting from individuals' interactions [23, 24]. Thus, this study examines, from a perspective of social processes based on a structural approach [25, 26], the relationships among antecedents of VT performance. The structural approach focuses "on relations rather than attributes, on structure rather than [an] isolated individual actor" [27, p. 280]. In this way, the effects of team members' trust-related positions in a network structure on creativity can be analyzed, considering perceived proximity from the perspective of social networks.

2. Literature Review

2.1. Perceived Proximity

Perceived proximity refers to "a dyadic and asymmetric construct which reflects one person's perception of how close or how far another person is" [19, p. 983] or "a cognitive and affective sense of relational closeness" [22, p. 1219]. Perceived proximity is regarded as an essential concept for understanding collaborative but geographically distributed work and has been given considerable attention in recent literature on team work [15, 19–22, 28]. The results obtained by O'Leary and Wilson [22] suggested that physical proximity (i.e., geographic closeness measured in miles or kilometers) does not affect the quality of relationships in geographically distributed teams but perceived proximity does affect these relationships. They also found that perceived proximity mediates the connection between communication and relationship quality. According to Cha and Park [21], team members' psychological proximity is significantly associated with team work quality. Based on the construal level theory of psychology, individuals' psychological proximity depends on the psychological distance they perceive. In addition, perceived proximity positively mediates relationships between team member isolation and team outcomes in virtually collaborative work environments by allowing individuals to feel psychologically

connected with other members of their team [28]. Wilson and O'Leary [19] examined the paradoxical phenomenon by proposing a model of perceived proximity. Paradoxical phenomenon refers to the notion that a person seems quite distant despite being in close physically proximity, while another person can seem quite close although he or she may be far away in objective terms. They argued that perceived proximity is completely subjective; therefore, one can perceive proximity differently depending on each individual's relative situation.

Perceived proximity is a dyadic and asymmetric construct [19]. Perceptions of proximity, like other perceptions and attitudes, have both cognitive and affective components. The cognitive dimension of perceived proximity is how distant a team member seems to be from an individual (i.e., "When I think of the other person, he or she seems far away" [19, p. 983]). An affective dimension is the subject's feelings toward another individual (i.e., "I feel close to the other person" [19, p. 983]).

2.2. Virtual Teams

The use of VTs is common in many industries and organizations [29] and are generally characterized as geographically dispersed work groups that use technology-mediated communication [10]. VTs can be defined as "functioning teams that rely on technology-mediated communication while crossing several different boundaries" [6, p. 807] and have been given considerable attention during the past decade [6, 30]. Previous studies identified factors that are drivers of success and failure in virtual teams, such as trust [31, 32], affect [33, 34], leadership [35], culture [29], knowledge sharing [32, 36], and communication [27, 29].

VT members usually communicate through ICT, without face-to-face contact or personal interactions. Therefore, it is essential for team members to obtain a certain level of communication quality [27, 29, 37], establish interpersonal trust [27, 31, 32], and manage affects and emotional conflict [33] to achieve effective team processes. Chang and Hung [29] investigated VT performance from the perspective of human-related factors (trust and culture) and technology-related factors (communication). Their result indicated that interpersonal trust and cultural adaptation are positively associated with VT performance. Communication quality, however, does not significantly influence VT performance. Although communication quality is an important factor of VT performance, this study failed to show a direct relationship between communication quality and performance. Sarker and Ahuja [27] examined the links between trust, communication, and member performance from a social network perspective. They proposed three models: additive, interaction, and mediation, which consisted of a trust centrality, communication centrality, and individual performance variables. The results of the study demonstrated that the mediating model (communication → trust → performance) best explains how communication and trust work together, by showing that communication does not directly influence individual performance but indirectly influences performance through trust. Moreover, in their addictive model, trust had a significant effect on performance, while communication did not have a direct influence on performance. In addition, findings from a longitudinal study by Kanawattanachai and Yoo [37] revealed that communication affects performance only within a certain amount of time (i.e., before the midpoint) during virtual collaboration work, but after the midpoint, communication does not directly affect performance.

2.3. Trust

Trust is an important part of relationships between two or more people and has been defined as "the extent to which a person is confident in, and willing to act on the basis of, the words, actions, and decisions of another"[38, p. 25]. In a team context, trust is referred to as "the degree of confidence of team members in one another" [32, p. 145] and is based on the assumption that others will behave as expected [39]. Previous studies identified that trust is a crucial quality for effective VTs [27, 29, 32] and creativity [40–42].

It is generally agreed that trust arises from distinct psychological processes [38, 43, 44]. Interpersonal trust has cognitive and affective foundations [44], and drawing from previous works, McAllister [38] suggested that

cognition-based trust and affect-based trust are principle forms of interpersonal trust. Cognition-based trust refers to trust from the head [45] and reflects perceived competence of others, while affect-based trust refers to trust from the heart [45] and depends on emotional bonds. This distinction is useful for management studies because each form of trust works in a unique manner and has a different antecedent and consequent variables [38]. Past studies have examined cognition- and affect-based trust using other variables [40, 45–47]. Parayitam and Dooley [46] investigated the moderating effect of two types of trust on the relationship between conflict and strategic decision-making outcomes. Their findings revealed that cognition-based trust moderates relationships, whereas affect-based trust does not. Barczak and Lassk [40] showed the effects of cognition- and affect-based trust on team creativity by empirically testing their proposed model. Their findings suggested that cognition-based trust positively influences team creativity but affect-based trust does not. This is because trust based on members' perception of their colleagues' competency is essential to team creativity whereas trust based on emotional bonds does not enhance team creativity, although it is useful for successful collaboration. Chua and Morris [48] examined the relationship between trust and creativity and found that both forms of trust positively influence creative collaboration. Additionally, they suggested that only affect-based trust can mediate the relationship between cultural metacognition (i.e., intercultural interaction) and creative collaboration. Recent work by Sarker and Ahuja [27] offered novel insights into the workings of social networks by introducing the concept of the trust centrality of an individual. They defined trust centrality as "the extent to which an individual enjoys a central position within a trust network" [27, p. 283] and examined the relationship between the two types of centrality (i.e., communication centrality and trust centrality) and individual performance in global VTs based on the social network approach. They developed a hypothesis that the communication centrality of a team member has a positive impact on his or her performance by drawing upon the babble hypothesis [58]. This hypothesis states that to people who communicate most actively are also the most positive group members. The results of Sarker and Ahuja's [27] study, however, showed that there was no significant direct effect of communication centrality on individual performance. The current study applied the trust centrality concept to affect-based trust and cognition-based trust, and to calculate a centrality index for individual team members using dimensions from both types of trust, relational data were collected by asking each team member to assess each other and inputting their responses into an adjacency matrix.

2.4. Creativity and social process

Creativity is defined as "the production of novel, useful ideas or problem solutions" [49, p. 368] and fosters an organization's competitive ability by enabling the organization to take advantage of emerging opportunities and to cope with environmental changes. From the interactionist's perspective, creative products are the outcome of processes engaged by people's interactions with their environment, including people, products, processes, and situations [50, 51]. Creativity does not happen inside an individual's head but through interactions with their environment [52]. Individuals may access novel perspectives and ideas and develop creative outcomes by communicating with others. Some researchers recognize creativity as a social process in social networks [23, 24] and consider the social side of creativity to be an essential part of such processes [53, 54].

Past research on networks and creativity indicated that networks have a positive influence on creative performance because they affect the reorganization of ideas that facilitate creativity [24, 55, 56]. How network position and structure influence individual team member's creative performance during virtual collaboration has not been extensively studied, although there are previous studies on networks and creativity [24, 27, 54, 57]. Perry-Smith and Shalley [54] examined the association between the context of social relationships and individual creativity and suggested that propositions that weaken ties generally facilitate creativity at work when compared to strong ties. Perry-Smith [24] empirically tested her hypotheses regarding relationship strength, network position, and external ties on creativity, and the results of her study demonstrated that weak ties are generally beneficial for creativity. Additionally, closeness centrality did not affect creativity on its own; however, when

individuals do not have outside ties, closeness centrality has a positive association with creativity. These results imply that the impact of network centrality on creativity can be moderated by other factors.

Examining the effects of communication density and centralization on creativity, Leenders and van Engelen [57] found that frequency of communication has an inversely U-shaped relationship with creativity, and the centralization of team communication has a negative impact on the creativity of a team. Therefore, team creativity is the most successful when communication density is modest, meaning that too much or too little communication among team members may hinder team creativity. In addition, when the communication channel converges on one or a few members, team creativity is also impeded.

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